

Honorable Ronald B. Leighton

UNITED STATES DISTRICT COURT

WESTERN DISTRICT OF WASHINGTON AT TACOMA

JACOB BEATY and JESSICA BEATY on  
behalf of themselves and all others similarly  
situated,

Plaintiffs,

v.

FORD MOTOR COMPANY,

Defendant.

Case No.: 3:17-cv-05201-RBL

DECLARATION OF JUSTIN  
MCCRARY, PH.D, IN SUPPORT OF  
SUMMARY JUDGMENT AND  
OPPOSITION TO CLASS  
CERTIFICATION

I, Justin McCrary, declare:

1. I am over the age of 18. I am competent to testify. I make this Declaration based upon personal knowledge.

2. I am an economist with expertise in economic modeling, law and economics, and statistical methods, among other subjects. I currently serve as the Paul J. Evanson Professor of Law at Columbia where I teach corporations, antitrust, economics, statistics, and law and economics. I have expertise in evaluating conjoint analysis methodologies.

3. Attached as **Exhibit A** is a true and correct copy of the May 24, 2019 report and attachments that I prepared for purposes of offering opinions in this matter. My report and its attachments contain the bases for my opinions as well as my qualifications.

1 Signed under penalty of perjury under the laws of the United States of America.

2 DATED this 6<sup>th</sup> day of September, 2019 at New York, New York.

3  
4 By: 

Justin McCrary, Ph.D

**CERTIFICATE OF SERVICE**

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N/A

DATED this 10th day of September 2019.

  
\_\_\_\_\_  
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**EXHIBIT A**

UNITED STATES DISTRICT COURT  
WESTERN DISTRICT OF WASHINGTON

JACOB BEATY and JESSICA BEATY on  
behalf of themselves and all others similarly  
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Case No. 3:17-CV-05201-RBL

EXPERT REPORT OF JUSTIN MCCRARY, PH.D.

May 24, 2019

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## 1. INTRODUCTION

### *1.1. Qualifications*

1. I am an economist with expertise in economic modeling, law and economics, and statistical methods, among other subjects. I received my A.B. in Public Policy from Princeton University in 1996. After working at National Economic Research Associates in White Plains, New York, and the Federal Reserve Bank of New York from 1996-1998, I began my Ph.D. in Economics at the University of California, Berkeley (“Berkeley”), completing the degree in June 2003. From 2003 through 2007, I was Assistant Professor of Public Policy and Assistant Professor of Economics at the University of Michigan (“Michigan”). In January 2008, I became Assistant Professor of Law at Berkeley and was promoted to Professor in July 2010. While at Berkeley, I taught courses on introductory, intermediate, and advanced statistics to J.D., L.L.M., and Ph.D. students; on law and economics to J.D. students as well as undergraduates; on labor economics to Ph.D. students in economics and in other fields; and on business law to J.D., L.L.M., and M.B.A. students.

2. From July 1, 2017, to December 31, 2017, I took leave from Berkeley and assumed a position as the Samuel Rubin Visiting Professor of Law at Columbia Law School (“Columbia”). In 2018, I joined the faculty at Columbia as the Paul J. Evanson Professor of Law, a position I hold today. At Columbia, I teach corporations, antitrust, economics, statistics, and law and economics.

3. In addition to my position as Professor at Berkeley, I served as the Founding Director of D-Lab, the Social Sciences Data Laboratory at Berkeley, from June 2014 to June 2017. At D-Lab, I lectured on and advised graduate students and faculty regarding high performance computing, statistical software, and statistical techniques.

4. From September 2008 until July 2014, when I began to direct the D-Lab, I co-directed the Law and Economics Program at Berkeley Law with Robert Cooter and Daniel Rubinfeld (2008–2011), and with Robert Cooter and Eric Talley (2012–2014).

5. Since 2008, I have co-directed the Economics of Crime Working Group of the National Bureau of Economic Research (“NBER”). The NBER is the preeminent professional association of economists in the world, with over 1,400 members worldwide. I was invited to become a Faculty Research Fellow of the NBER in 2006 and remained in that position until 2012, when I was invited to become a Faculty Research Associate.

6. As noted, I previously worked at the University of Michigan. From 2003 through 2007, I was Assistant Professor of Public Policy and Assistant Professor of Economics. While at Michigan, I taught introductory statistics and advanced microeconomic theory to M.P.P. students, and advanced econometric theory to Ph.D. students.

7. My research spans a range of topics, including econometric and statistical methodology, antitrust, crime, employment discrimination, education, fertility, financial markets, income inequality, and monetary policy. Many of my articles have been published in leading peer-reviewed economics journals such as the *American Economic Review*, the *Review of Economics and Statistics*, the *Journal of Economic Literature*, and the *Journal of Econometrics*.

8. In addition, I am frequently asked to review articles for the leading economics journals, including *Econometrica*, the *American Economic Review*, the *Quarterly Journal of Economics*, the *Journal of Political Economy*, the *Review of Economic Studies*, the *Journal of Econometrics*, the *Review of Economics and Statistics*, and the *American Law and Economics Review*. In my research and as a reviewer, I have dealt with analysis of market data (e.g., prices, sales), survey data and with the types of statistical analysis used in analyzing conjoint surveys.

9. I have co-edited a book, *Controlling Crime: Strategies and Tradeoffs*, which was published by the University of Chicago Press. Over the years, my research has been supported by the universities at which I have taught, the Arnold Foundation, the MacArthur Foundation, the NBER, the National Institutes of Health, the National Science Foundation, the Robert Wood Johnson Foundation, and the Spencer Foundation.

10. I frequently provide pro bono consulting to federal, state, and local government entities, including the U.S. Department of Justice, the California



Department of Justice, the Equal Employment Opportunity Commission, and the City of Chicago.

11. In addition to my work as an academic and as a testifying expert, I have experience as a consultant on a variety of matters. My consulting experience has spanned a wide range of industries and markets, with many involving the study and use of economics, econometrics, and statistics.

12. I have served as an expert witness in a variety of litigation matters, including matters involving consumer class actions, and provided economic and statistical analysis on issues related to class certification, among others. I am being compensated for my work on this matter at my standard rate of \$900 per hour. I have been assisted in this matter by staff of Cornerstone Research, who worked under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my compensation in this matter nor my compensation from Cornerstone Research is in any way contingent or based on the content of my opinion or the outcome of this or any other matter.

13. A copy of my curriculum vitae, including a list of my previous testimony and depositions, is included as Appendix A. A list of the materials I have considered in forming my opinions is included as Appendix B.

## ***1.2. Summary of Allegations***

14. Plaintiffs allege that the panoramic sunroofs in certain types of Ford and Lincoln vehicles are defective, as evidenced by their alleged “propensity to spontaneously shatter” (which Plaintiffs term “the Defect”).<sup>1</sup> Plaintiffs claim that Ford “knew or should have known about the Defect since at least 2008,” failed to disclose it to consumers, and failed to issue a recall.<sup>2</sup> Plaintiffs also allege that Ford has “systematically denied” warranty coverage on the costs to repair the defective panoramic sunroofs.<sup>3</sup> The existence of the alleged Defect, Ford’s knowledge of the alleged Defect, and Ford’s alleged failure to disclose the alleged Defect and issue a recall are referred to herein collectively as the

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<sup>1</sup> Class Action Complaint, *Jacob Beaty and Jessica Beaty vs. Ford Motor Company*, March 16, 2017 (“Complaint”), ¶ 4. Plaintiffs define panoramic sunroofs as sunroofs that “account for nearly the entire roof of the vehicle” and state that Ford calls the sunroofs at issue “Panoramic Sunroofs, Panoramic Vista Roofs, Dual Panel Moonroofs, or Power Monroofs depending on the vehicle model.” Complaint, ¶ 2. Throughout this report, I use the term “panoramic sunroofs” to refer to the sunroofs at issue in this case.

<sup>2</sup> Complaint, ¶¶ 4, 7, 10.

<sup>3</sup> Complaint, ¶¶ 67–68.

“Challenged Conduct.” Plaintiffs further allege that “[h]ad Plaintiffs and the Class known of the Defect, they would not have purchased (or would have paid substantially less for) their Class Vehicles.”<sup>4</sup>

15. Plaintiffs propose a class of all “consumers who purchased or leased Ford vehicles with panoramic sunroofs, or in the alternative all Washington consumers.”<sup>5</sup> Plaintiffs claim that the following six vehicle models are in the proposed class:<sup>6</sup>

- 2007-2014 Ford Edge
- 2013-2017 Ford Escape
- 2011-2017 Ford Explorer
- 2007-2015 Lincoln MKX
- 2010-2017 Lincoln MKT
- 2009-2016 Lincoln MKS.

### ***1.3. Assignment***

16. I have been asked by counsel for Ford to:

- Evaluate whether the proposed conjoint analysis approach put forth by Plaintiffs’ experts, Mr. Gaskin and Mr. Weir (“Proposed Conjoint Method”), is capable of determining the harm, if any, experienced by individual class members or the class-wide harm to the proposed class, if any, due to the Challenged Conduct.
- Use real-world data from actual market transactions to evaluate whether injury or damages due to the Challenged Conduct can be assessed using a common, formulaic method or whether it would require individual inquiry of class members.

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<sup>4</sup> Complaint, ¶ 111. Plaintiffs similarly allege that, “Plaintiffs and the other Class Members bought or leased Class Vehicles they otherwise would not have, overpaid for their vehicles, did not receive the benefit of their bargain, and their Class Vehicles suffered a diminution in value.” Complaint, ¶ 101.

<sup>5</sup> Complaint, ¶ 11.

<sup>6</sup> Stipulated Motion to Amend the Class Definition And Proposed Order, *Jacob Beaty and Jessica Beaty vs. Ford Motor Company*, March 27, 2019, pp. 1–2.

### 1.4. Summary of Opinions

17. Based on my analyses and review of the evidence, I find that:

- **Real-world market data are useful in assessing the harm, if any, due to the Challenged Conduct. Such data are also useful in assessing whether the Challenged Conduct would have a common impact across class members.** Real-world market data show the prices paid by individual consumers in actual transactions, and thus, account for both supply and demand factors. Additionally, since these data record individual transactions, they are well suited to investigate issues related to heterogeneity across class members.
- **The approach proposed by Mr. Gaskin and Mr. Weir, which does not utilize real-world market data, cannot determine class-wide harm.** Mr. Gaskin’s proposed conjoint survey analysis can, at most, provide an estimate of the difference in consumer willingness to pay for a sunroof with and without a specific alleged defect. Mr. Weir’s proposed class-wide “overpayment damages” calculation then multiplies (i) the difference in average willingness to pay obtained from the conjoint analysis by (ii) the total sales of at-issue vehicles.<sup>7</sup> However, consumer willingness to pay is different from and typically higher than the market price of the product feature. The market price depends on the intersection of demand and supply, and contrary to the claims of Plaintiffs’ experts, their proposed approach does not take into account relevant supply side factors. As a result, their proposed approach cannot determine how market prices or purchase decisions would have changed had Ford disclosed the alleged defect.
- **The approach proposed by Mr. Gaskin and Mr. Weir does not attempt to determine the harm experienced by individual class members.** Mr. Weir’s proposed damages calculation utilizes the difference in *average* willingness to pay for a sunroof with and without a specific alleged defect. The average is taken across the participants in

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<sup>7</sup> Mr. Weir uses the term “overpayment percent” for the conjoint survey result that he uses as an input to his damages calculation. Mr. Weir uses a single number for this percent, which is an average across survey participants, and which he multiplies by vehicle sales to obtain “overpayment damages.” Expert Report of Colin B. Weir, February 22, 2019 (“Weir Report”), ¶ 51. I refer to it as the “percentage change in [consumer] willingness to pay” because it is not based on actual prices reflecting supply and demand factors, so it does not measure a price overpayment. Multiplying willingness to pay by vehicle sales, as Mr. Weir does, does not overcome this issue.

the conjoint survey. By using the average, he masks all potential heterogeneity that exists across class members. His average is not specific to any individual class member. It is incorrect to assume that class members would be uniformly impacted, due to the reasons discussed next.

- **Transaction data and academic literature show that automobile prices are affected by numerous individualized factors, which leads to seemingly similar vehicles selling for drastically different prices and belies Plaintiffs' assumption of uniform or common impact. Additionally, such price variation is substantially greater than the suggested price of a panoramic sunroof, implying that it would be difficult to distinguish from unexplained price variation any harm due to the Challenged Conduct.** Examples of factors driving price variation include, but are not limited to, the condition of a used vehicle, the dealer's inventory, the terms of the transaction, and the buyer's information and search process. Due to such factors, even the prices of seemingly similar vehicles sold at the *same dealership around the same date* can vary considerably. Only an individualized inquiry can fully account for these factors. Plaintiffs' experts have not analyzed any of these real-world data and do not attempt to account for this heterogeneity.
- **Plaintiffs' proposed method of assessing harm also ignores that many putative class members may not have been harmed because of the timing of their individual transaction.** For example, any putative class member who bought and sold an at-issue vehicle before there was any disclosure or knowledge of the alleged defect may not have suffered any diminution in value. While Mr. Weir contends that such a class member would have been harmed, he is assuming there was an overpayment at the time of the initial purchase. This is an empirical question that requires empirical analysis. And as I discuss next, the real-world market data do not show an impact of the alleged defect on market prices.
- **Transaction data on at-issue vehicles suggest that (i) any potential impact of the Challenged Conduct varies by vehicle type and (ii) there is no common impact due to the Challenged**

**Conduct.** I perform five case studies that compare prices of at-issue vehicle groups to comparison groups. The economic evidence is inconsistent with Plaintiffs' claims, as the at-issue vehicles tend to retain their value at least as well as the comparison vehicles.

## **2. THE PROPOSED CONJOINT METHOD CANNOT DETERMINE THE HARM EXPERIENCED BY INDIVIDUAL CLASS MEMBERS OR THE CLASS-WIDE HARM**

18. In this section, I first provide brief overviews of the expert reports of Mr. Gaskin and Mr. Weir. I then explain why their methodology cannot determine either the alleged harm experienced by individual class members or the alleged class-wide harm.

### ***2.1. Overview of the Expert Reports of Mr. Gaskin and Mr. Weir***

19. Mr. Gaskin states that his assignment was "to design and describe a market research survey and analysis that would ... assess the reduction in market value resulting from the defect in the panoramic vista roofs."<sup>8</sup> He decides on choice-based conjoint survey analysis as "the best methodology" to address this question.<sup>9</sup> A conjoint survey describes a set of hypothetical products with various features to a group of respondents who choose which product they would hypothetically be willing to purchase.<sup>10</sup> This method attempts to estimate how respondents, on average, are willing to trade-off between the features in question. Mr. Gaskin opines that the conjoint analysis he "intend[s] to run is designed to estimate the reduction in market value (measured in dollars and/or percentage terms) caused by the panoramic vista roof defect."<sup>11</sup> Mr. Gaskin does not present actual survey results, but rather, describes the survey he intends to run.<sup>12</sup>

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<sup>8</sup> Expert Report of Steven P. Gaskin, February 22, 2019 ("Gaskin Report"), ¶ 4.

<sup>9</sup> Gaskin Report, ¶ 4.

<sup>10</sup> "Conjoint analysis sometimes referred to as stated preference modelling involves the use of hypothetical choice situations generated according to the principles underlying the design of statistical experiments to measure individuals' preferences, examine consumer choice behavior [sic] and/or predict their choice in new situations." Jan Dijkstra, W. A. H. Roelen, and H. J. P. Timmermans, "Conjoint measurement in virtual environments: a framework," In Proceedings of 3rd Design and Decision Support Systems in Architecture and Urban Planning Conference, vol. 1, 1996, pp. 1–13 at p. 1.).

<sup>11</sup> Gaskin Report, ¶ 10.

<sup>12</sup> Mr. Gaskin provides the following details on the proposed survey: It will be internet-based with an estimated sample size of 250-300 respondents. It will include "...twelve choice tasks, each containing a choice set of three different, hypothetical Ford SUVs that will be described by the combinations of levels of the features." Mr. Gaskin lists the following features (the number of alternatives he would use for each feature are in parentheses): driver's seat (3), steering (3), panoramic vista roof (3), comfort options (3), passenger capacity (2), foot-activated

20. Mr. Weir states that his assignment was, among other things, “to determine whether it would be possible to calculate economic damages, if any, in this litigation, and if so, to set forth a framework for ... calculation of those damages.”<sup>13</sup> Mr. Weir explains that he will calculate alleged “overpayment damages” as the “Average Purchase Price per Vehicle” times the “Conjoint Overpayment %” times the “Number of Vehicles Sold.”<sup>14</sup> The alleged “conjoint overpayment percent” will be obtained from Mr. Gaskin’s conjoint survey analysis. Mr. Weir contends that he will obtain the required sales data from information provided by Ford, and possibly from discovery and claims administration.<sup>15</sup> Mr. Weir does not put forth an actual damages estimate. Mr. Weir also opines that “[a]ll relevant data needed to complete the conjoint analysis is Class-wide, common evidence” and that “no individualized analyses, or Class-Member-specific inquiry is required.”<sup>16</sup>

21. In summary, Plaintiffs’ experts propose to (i) use conjoint analysis to obtain what they call an “overpayment percent” resulting from the alleged panoramic sunroof defect, and (ii) obtain “overpayment damages” as the product of that percent and the dollar sales of vehicles at issue.

***2.2. The Proposed Conjoint Method Cannot Estimate the Impacts on Average Market Prices or the Impacts on Individual Class Members***

22. Even assuming that Plaintiffs’ conjoint survey is correctly designed and implemented, there are two fundamental reasons that Plaintiffs’ approach cannot answer the question of whether individual class members were harmed and, if so, how much.

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liftgate (3), navigation system (3), driving/parking assistance (3), price (5). One key feature is the “panoramic vista roof.” Mr. Gaskin has chosen the following three alternatives for this feature: “[vehicle] does not come equipped with a sunroof,” “[vehicle] has a panoramic vista roof that may spontaneously break while the vehicle is parked or in motion,” and “[vehicle] has a panoramic vista roof that will not spontaneously break under normal driving conditions.” Gaskin Report, ¶¶ 28, 35, 42.

<sup>13</sup> Weir Report, ¶ 7. Mr. Weir was also asked to “evaluate the suitability of a conjoint survey.” Weir Report, ¶ 7.

<sup>14</sup> Weir Report, ¶ 51.

<sup>15</sup> Weir Report, ¶ 48.

<sup>16</sup> Weir Report, ¶ 20.

*2.2.1. Conjoint Analysis Estimates Consumer Willingness to Pay for a Product Feature, not the Market Price of the Product Feature*

23. First, conjoint analysis, by itself, cannot determine how much the market price of a product or product feature was affected by the Challenged Conduct. The measure estimated by conjoint analysis is consumer “willingness to pay,” measured in dollars, for a given product feature, which only relates to consumer demand.<sup>17</sup> This is different from and typically higher than the market price of the product feature,<sup>18</sup> because the market price depends on the intersection of demand and supply,<sup>19</sup> and conjoint analysis does not measure or take into account any supply side factors.<sup>20</sup> For that reason, their so-called “overpayment percent” cannot measure a price overpayment, but only consumer willingness to pay.

24. The following example, from a book on conjoint analysis cited by Mr. Gaskin, illustrates why willingness to pay can greatly exceed market prices:

What is your willingness to pay for a color monitor for your laptop computer versus a monochrome screen? Assume we conducted a conjoint analysis including monochrome versus color monitors. If we computed your willingness to pay for color over monochrome, we would likely find that the incremental value of color over monochrome is worth a thousand dollars or more. But how meaningful is this information to a laptop manufacturer given the fact that laptops with

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<sup>17</sup> “The results of conjoint analysis may be used to assess the price elasticity of products and services. It may also be used to assess buyer price sensitivity and willingness to pay... Willingness to pay is a characteristic of buyers or consumers. A measure of willingness to pay shows how much value an individual consumer places on a good or service. It is measured in terms of money.” Bryan K. Orme, “Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research,” Third Edition, Research Publishers LLC, 2014, p.88. Mr. Gaskin cites this book. Gaskin Report, p. 16.

<sup>18</sup> “In general, the WTP [willingness to pay] measure will overstate the change in equilibrium price.” Greg Allenby, Jeff Brazell, John Howell, and Peter Rossi, “Using Conjoint Analysis to Determine the Market Value of Product Features.” Proceedings of Sawtooth Software Conference, October 2013, pp. 341–355 at p. 342.

<sup>19</sup> “The quantity demanded of any good is the amount of the good that buyers are willing and able to purchase... [D]emand curve [is] a graph of the relationship between the price of a good and the quantity demanded... The quantity supplied of any good or service is the amount that sellers are willing and able to sell... The curve relating price and quantity supplied is called the supply curve... [T]here is one point at which the supply and demand curves intersect. This point is called the market’s equilibrium. The price at this intersection is called the equilibrium price, and the quantity is called the equilibrium quantity.” N. Gregory Mankiw, *Principles of Microeconomics*, Seventh Edition, (Stamford, CT: Cengage Learning, 2013), pp. 67–68, 73–74, 77.

<sup>20</sup> “WTP measures only a shift in the demand curve and not what the change in equilibrium price will be as the feature is added or enhanced.” Greg Allenby, Jeff Brazell, John Howell, and Peter Rossi, “Using Conjoint Analysis to Determine the Market Value of Product Features.” Proceedings of Sawtooth Software Conference, October 2013, pp. 341–355 at p. 342.



color monitors are readily available in the market at quite inexpensive prices?<sup>21</sup>

25. This limitation of conjoint analysis constitutes one reason to turn to actual market data, showing the prices paid by individual consumers in actual transactions. Such data are available, as I discuss below, but Mr. Gaskin and Mr. Weir have not analyzed them.<sup>22</sup> Data on actual market outcomes, such as market prices, reflect the impact of both demand and supply factors.

26. Mr. Gaskin and Mr. Weir wrongly contend that their proposed approach accounts for the relevant supply side factors, instead of simply measuring consumer willingness to pay.<sup>23</sup> But the factors Mr. Gaskin and Mr. Weir purport to consider and account for, such as competitive dynamics and actual market prices, do not enter into their proposed approach at all. As a result, Mr. Gaskin and Mr. Weir's approach cannot determine how the market price would have changed—as opposed to how consumer willingness to pay would have changed—had Ford disclosed the alleged Defect. I now discuss two types of supply-side factors they wrongly claim to account for.

27. First, Plaintiffs' experts wrongly claim to account for competition among suppliers in the automobile industry.<sup>24</sup> I agree that the competitive dynamics in this industry are a relevant supply side factor. However, a conjoint survey of *consumer* preferences and willingness to pay for certain product features would not generate any results about how *suppliers* compete with each other. For example, the proposed conjoint survey provides no information on the competitive response of other automobile manufacturers to a disclosure by Ford. In particular, would competitors also disclose their incidence rates, how would their incidence rates compare to Ford's, and how would they change their prices and supply? Such factors would affect consumer decisions, yet are

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<sup>21</sup> Bryan K. Orme, "Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research," Third Edition, Research Publishers LLC, 2014, p. 91.

<sup>22</sup> Mr. Gaskin concedes this in his deposition: "Q: So you didn't look at any real market data or transaction prices of vehicles with panoramic sunroofs? ... A: Well, we've got Colin Weir to do that and to consult with me on using a proper range of prices in my design." Gaskin Deposition, p. 95:13–19.

Mr. Weir also concedes this in his deposition: "I think to date, for purposes of demonstrating the method that Mr. Gaskin and I have set forth, I have looked only at MSRP data and not transaction data, with an understanding that were the case to move forward, there would be opportunities to refine that research." Weir Deposition, p. 11:1–7. See also Weir Deposition, pp. 14:20–24, 141:5–143:8.

<sup>23</sup> Gaskin Report, ¶ 22; Weir Report, ¶¶ 29, 34–37.

<sup>24</sup> "...[A]nother important supply-side factor that Mr. Gaskin and I [Mr. Weir] discussed was that... the market for the Vehicles was an "ordinary" and mature market, subject to competitive pressures that both Defendants and retailers identified as risks to their business." Weir Report, ¶ 37. Mr. Weir also describes the automobile market as a highly competitive market, and market competition as an important supply side factor. Weir Report, ¶ 38.



not part of the conjoint survey. For example, Mr. Gaskin's proposed survey presents respondents with hypothetical choices relating to a generic Ford SUV but provides *no* information on Ford's competitors.<sup>25</sup> Mr. Weir's proposed damages calculation—which simply multiplies the so-called “conjoint overpayment percent” by the total dollar sales of at-issue vehicles—also fails to account for such competitive dynamics. While Mr. Weir discusses several supply-side factors, such as competitive dynamics,<sup>26</sup> his proposed simplistic calculation does not incorporate them.

28. Second, Plaintiffs' experts wrongly claim they account for “the actual market prices that prevailed during the Class Periods.”<sup>27</sup> However, rather than using market prices observed in actual transactions, Plaintiffs' experts use the Manufacturer's Suggested Retail Price (“MSRP”).<sup>28</sup> As discussed in Section 3.4, actual transaction prices do not generally equal MSRPs, and are often lower than MSRPs.

### *2.2.2. Plaintiffs' Approach Does Not Attempt to Estimate the Change in Willingness to Pay for Individual Class Members*

29. The second reason that Plaintiffs' approach cannot determine the price that specific class members would have paid had Ford disclosed the alleged defect is that their approach only attempts to estimate the *average* percent change in willingness to pay. They acknowledge that they do not attempt to assess the percent change in willingness to pay or damages for *individual* class members.<sup>29</sup> Plaintiffs' experts offer no evidence that the percent change in

<sup>25</sup> Gaskin Report, p. 7, Figure 1.

<sup>26</sup> “I have also considered supply side factors in my damages framework.” Weir Report, ¶¶ 29, 51.

<sup>27</sup> “It is my opinion, based on conversations with Plaintiff's economics expert, Mr. Colin Weir, that the conjoint methodology set forth in this declaration accounts for appropriate supply side factors, including that (1) the price range used in the survey reflects the actual market prices that prevailed during the Class Periods...” Gaskin Report, ¶22.

<sup>28</sup> Gaskin Report, ¶ 23.

<sup>29</sup> For example, the so-called “conjoint overpayment percent” in Mr. Weir's damages formula is an average and not for any specific class member. Weir Report, ¶ 51. Mr. Weir concedes this in his deposition: “it's my understanding that step one is to determine aggregate damages to the class, which is what I have set forth in this report, and that damages to the class would at some point as part of claims administration be allocated to various individuals.” Weir Deposition, p. 88:1–8. While Mr. Weir suggests that differences across class members are just an allocation issue that can be handled through claims administration, his approach, which masks all heterogeneity across class members, cannot assess the key issue of whether specific class members experienced any harm.

Mr. Gaskin also concedes this in his deposition: “Q: You were not asked to develop a methodology for determining what factors actually influenced each proposed class member's decision to purchase their vehicle, correct? A: I'd say the same answer; I have not done that, and it's because I did not need to do that to give the answer I need to give in this case.” Gaskin Deposition, p. 300:7–15.

willingness to pay would be common across class members. In fact, by ignoring transaction data, they are unable to evaluate whether there would be important differences across class members. In the remaining sections, I explain that their identical percent change assumption is implausible in light of academic literature on the automobile industry and transaction data on the vehicles at issue.

### **3. NUMEROUS INDIVIDUALIZED FACTORS IMPACT THE SALES PRICES OF VEHICLES, AS SHOWN IN THE ACADEMIC LITERATURE AND CONFIRMED IN THE TRANSACTION DATA**

30. As discussed above, Plaintiffs' experts put forth a method that supposedly allows them to determine the average percent change in willingness to pay due to the Challenged Conduct. By using the average, they mask all potential heterogeneity that could exist across class members and incorrectly assume that all class members would be harmed. Their method cannot take into account characteristics unique to specific proposed class members and transactions, even setting aside some of the more fundamental shortcomings I have discussed above. As a result, the Proposed Conjoint Method, even if appropriately implemented, cannot determine whether specific class members were harmed.

31. An assumption of uniform impact does not fit the automobile industry, which has considerable complexity and heterogeneity. Put simply, an automobile is not a commodity product.<sup>30</sup> Countless factors impact the price a given class member paid for their vehicle, such as the dealer's inventory, the vehicle's trim level, the class member's access to information and search process, and whether the class member traded-in another vehicle. Moreover, many of the factors that drive price variation are not captured in the available data, such as the mechanical condition of a used car, and some factors are difficult to even measure, such as the bargaining power of buyers and sellers. Thus, there are individualized and often unobserved factors driving automobile prices that must be investigated to understand each class member's experience

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<sup>30</sup> At his deposition, Mr. Weir conceded that automobiles do not meet the definition of a commodity: "Q. What is your definition of a commodity product, as an economist? A. ...A commodity product is one in which there is no differentiation between the various offerings of that product....Q. Automobiles are highly differentiated, correct? A. I would say that there is product differentiation that occurs with automobiles." Weir Deposition, pp. 45:18–47:4.

and to determine the price each class member would have paid in Plaintiffs' but-for world in which Ford disclosed the alleged defect.

32. In Section 3.1, I rely on academic articles and public press to provide a non-exhaustive illustration of the individual factors that influence automobile prices. In Section 3.2, I use transaction data of at-issue vehicles to confirm that the findings of the academic literature apply to this case. I find that observationally equivalent vehicles sell for substantially different prices, even at the same dealer. This shows that unobserved and likely individualized factors, such as negotiation skills, can have a substantial impact on prices. Plaintiffs' experts have ignored this complexity and heterogeneity by completely ignoring real-world transaction data.

### ***3.1. The Automobile Industry is Characterized by Considerable Heterogeneity and Complexity so Common Impact Cannot be Assumed***

33. As discussed above, Plaintiffs and their experts assume a uniform impact across class members without undertaking any analysis of the real-world market data.<sup>31</sup> Their assumption is belied by automobile market data and academic literature. In fact, the academic literature on automobiles and my analysis of the real-world data shows there cannot be a uniform impact.

34. This literature shows that a variety of individualized factors affect automobile prices and purchase decisions. In this section, I present a non-exhaustive list, which I categorize into factors related to consumers, suppliers, vehicles, and transaction terms. Investigation of these factors, many of which are not captured in available data, would be necessary to determine the price a specific class member would have paid in Plaintiffs' but-for world. Without accounting for these factors and their impact on prices, it is not possible to accurately determine the effect of the Challenged Conduct on prices.

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<sup>31</sup> Mr. Gaskin states that his approach "can determine the reduction in market value (measured in dollar and/or percentage terms) between class vehicles without the panoramic vista roof defect compared to otherwise identical class vehicles subject to the panoramic vista roof defect." Gaskin Report, ¶ 22. He intends to obtain a "conjoint overpayment percent" from the conjoint survey which Mr. Weir intends to use in his "overpayment damages calculation." Weir Report, ¶ 51. The "conjoint overpayment percent" is a single number, which is an average across the conjoint survey participants, and which Mr. Weir multiplies by the dollar value of sales at issue to obtain "overpayment damages." Thus, by using a single number for the "overpayment percent" in this calculation, they allow for no heterogeneity across class members in their "overpayment damage calculation" and do not permit some class members to be unharmed. Weir Report, ¶ 51.

### 3.1.1. Consumer Heterogeneity

**35. Negotiation.** When an individual makes the decision to purchase a vehicle—whether at a dealership or from a private seller—there is often some degree of price negotiation involved in that process.<sup>32</sup> Purchasers of vehicles vary in their willingness to bargain: some may decide to negotiate aggressively for months, some like the Beatys may rely on third parties (e.g., Costco) to do part of the negotiation on their behalf,<sup>33</sup> while others may decide not to bargain at all, whether because of a lack of skill or willingness to do so. This can have a large effect on the transaction price of a vehicle, as academic research has found that those with the lowest willingness to bargain pay hundreds of dollars more for an otherwise identical vehicle than those who like bargaining more.<sup>34</sup>

**36. Information and Search Process.** Just as consumers differ in their willingness to bargain, they also differ in the amount of time they are willing to invest in researching vehicles. For example, some consumers may research prices only at a few dealer websites, some may supplement online research with visits to actual dealerships, some (like Jacob Beaty) may rely primarily on independent third party reviews,<sup>35</sup> and others may do little or no research. The extent to which consumers are willing to search for and obtain information has a material effect on the prices they end up paying for otherwise similar vehicles.<sup>36</sup> For example, academic studies have shown that the use of the internet to learn about prices and promotions offered by other dealers can

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<sup>32</sup> Fiona Scott Morton, Jorge Silva-Risso, and Florian Zettelmeyer, “What Matters in a Price Negotiation: Evidence From the U.S. Auto Retailing Industry,” *Quantitative Marketing and Economics* 9, no. 4, 2011, pp. 365–402 at p. 366; Meghan Busse and Jorge Silva-Risso, “‘One Discriminatory Rent’ or ‘Double Jeopardy’: Multi-component Negotiation for New Car Purchases,” *American Economic Review: Papers and Proceedings* 100, no. 2, 2010, pp. 470–474 at p. 470.

<sup>33</sup> “Q: ... [W]hat motivated you to use the Costco price? A. A friend had used it in the past. It’s a pretty simple process that moves away from the whole back and forth with the dealer.” Jacob Beaty Deposition, Vol. 1, pp. 71:25–72:3.

<sup>34</sup> Fiona Scott Morton, Jorge Silva-Risso, and Florian Zettelmeyer, “What Matters in a Price Negotiation: Evidence From the U.S. Auto Retailing Industry,” *Quantitative Marketing and Economics* 9, no. 4, 2011, pp. 365–402 at p. 368; Florian Zettelmeyer, Fiona Scott Morton, and Jorge Silva-Risso, “How the Internet Lowers Prices: Evidence from Matched Survey and Auto Transaction Data,” *Journal of Marketing Research* 43, no. 2, 2006, pp. 168–181 at pp. 178–179.

<sup>35</sup> “Q: ...[Y]ou don’t recall specifically reading information on Ford.com or Ford’s official website prior to purchasing the Escape, you don’t recall either way? A. No, I would probably have taken independent third party’s view ... on the vehicle.” Jacob Beaty Deposition, Vol. 1, p. 104:13–20.

<sup>36</sup> Fiona Scott Morton, Jorge Silva-Risso, and Florian Zettelmeyer, “What Matters in a Price Negotiation: Evidence From the U.S. Auto Retailing Industry,” *Quantitative Marketing and Economics* 9, no. 4, 2011, pp. 365–402 at p. 367; Florian Zettelmeyer, Fiona Scott Morton, and Jorge Silva-Risso, “How the Internet Lowers Prices: Evidence from Matched Survey and Auto Transaction Data,” *Journal of Marketing Research* 43, no. 2, 2006, pp. 168–181 at pp. 169, 175–176.

affect the price a purchaser ends up paying,<sup>37</sup> and researchers have also found that buyers who visit more dealers tend to pay less for a given vehicle.<sup>38</sup> Much as is the case with bargaining, this could lead to otherwise similar consumers purchasing identical vehicles at different prices. This heterogeneity among class members in their involvement in the search process or use of bargaining would lead to differences in their knowledge of and response to a Ford disclosure, which would lead to a non-uniform impact.<sup>39</sup>

### *3.1.2. Supplier Heterogeneity*

**37. Incentives and Promotions.** Dealers and manufacturers regularly offer incentives and promotions to affect vehicle prices and stimulate sales.<sup>40</sup> Incentives can take many forms, including cash rebates from manufacturers to purchasers, cash payments from manufacturers to dealerships, and incentives that manufacturers offer at the time of purchase such as reduced interest rates.<sup>41</sup> Incentives and promotions offered by manufacturers can be applied at the discretion of dealers to different purchasers at different points in time and at different rates.<sup>42</sup> Academic research has found that variation in incentives and promotions offered by manufacturers across regions and at different points in time (even within the same month) can cause considerable variation in transaction prices.<sup>43</sup>

**38. Inventory Levels.** Dealers may be more willing to negotiate prices downward if they have a sufficiently high inventory level. For example, academic research has shown that dealers that experience an increase in their

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<sup>37</sup> Florian Zettelmeyer, Fiona Scott Morton, and Jorge Silva-Risso, “How the Internet Lowers Prices: Evidence from Matched Survey and Auto Transaction Data,” *Journal of Marketing Research* 43, no. 2, 2006, pp. 168–181 at p. 179.

<sup>38</sup> Fiona Scott Morton, Jorge Silva-Risso, and Florian Zettelmeyer, “What Matters in a Price Negotiation: Evidence From the U.S. Auto Retailing Industry,” *Quantitative Marketing and Economics* 9, no. 4, 2011, pp. 365–402 at pp. 389, 391, Table 4.

<sup>39</sup> For example, a class member who was willing to bargain may have been able to negotiate a lower price in response to a disclosure than a class member who would not bargain or who would have ignored a disclosure.

<sup>40</sup> Meghan Busse, Jorge Silva-Risso, and Florian Zettelmeyer, “\$1000 Cash Back: The Pass-Through of Auto Manufacturer Promotions,” *American Economic Review* 96, no. 4, 2006, pp. 1253–1270 at p. 1253.

<sup>41</sup> Meghan Busse, Jorge Silva-Risso, and Florian Zettelmeyer, “\$1000 Cash Back: The Pass-Through of Auto Manufacturer Promotions,” *American Economic Review* 96, no. 4, 2006, pp. 1253–1270 at p. 1253.

<sup>42</sup> Meghan Busse, Jorge Silva-Risso, and Florian Zettelmeyer, “\$1000 Cash Back: The Pass-Through of Auto Manufacturer Promotions,” *American Economic Review* 96, no. 4, 2006, pp. 1253–1270 at p. 1268.

<sup>43</sup> Meghan Busse, Jorge Silva-Risso, and Florian Zettelmeyer, “\$1000 Cash Back: The Pass-Through of Auto Manufacturer Promotions,” *American Economic Review* 96, no. 4, 2006, pp. 1253–1270 at pp. 1260, 1263, Table 2.

inventory, from a low level to an average level, reduce their vehicle prices by about \$250 on average.<sup>44</sup> This means that individuals could buy otherwise identical vehicles but pay different amounts due to differences in inventory. This heterogeneity among suppliers in inventory levels and use of incentives would lead different dealers and intermediaries to respond differently to a Ford disclosure, which in turn would lead to non-uniform impact on class members.

### *3.1.3. Vehicle Heterogeneity*

**39. Condition of Used Vehicles.** The at-issue vehicles vary in many dimensions, such as their model, year, and whether they are new. For brevity, I provide one illustrative example – the condition of used vehicles. Used vehicles that are identical in many dimensions, such as model or year, could differ substantially in their engine condition or exterior condition, which would lead to price variation.<sup>45</sup> Detailed individualized inquiry would be required then to assess the condition of a used vehicle. The prices of used vehicles of different condition would likely experience differential changes in response to a Ford disclosure, again leading to a non-uniform impact.

### *3.1.4. Heterogeneity in Transaction Terms*

**40. Transaction Terms.** The terms of a sale – such as whether the transaction is a lease, financed, settled in cash, and/or involves a used car trade in – can affect the prices paid by individual buyers for identical vehicles in otherwise identical circumstances. For example, dealers may be willing to trade-off profits on one component of the sale (e.g., offering a lower trade-in amount) against profits on another component (e.g., charging a lower price on the new vehicle).<sup>46</sup> Similarly, some buyers may be willing to accept a lower trade-in value for their vehicle if doing so results in the dealer offering them a

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<sup>44</sup> Florian Zettelmeyer, Fiona Scott Morton, and Jorge Silva-Risso, “Scarcity Rents in Car Retailing: Evidence from Inventory Fluctuations at Dealerships,” NBER Working Paper no. 12177, 2006, p. 3.

<sup>45</sup> For example, the Kelley Blue Book states that, “The final sale price will likely be less depending on the vehicle's actual condition, popularity, type of warranty offered and local market conditions.” <https://www.kbb.com/company/faq/used-cars/>, accessed May 16, 2019.

<sup>46</sup> Meghan Busse and Jorge Silva-Risso, “‘One Discriminatory Rent’ or ‘Double Jeopardy’: Multi-component Negotiation for New Car Purchases,” *American Economic Review: Papers and Proceedings* 100, no. 2, May 2010, pp. 470, 473.



lower sticker price.<sup>47</sup> Lease transactions create additional complexity, as lease terms like the monthly payment and the amount to purchase the vehicle at the end of the lease, would vary across consumers.<sup>48</sup> This heterogeneity in transaction terms is another source of non-uniform impact across class members.

### **3.2. Transaction Data Show Considerable Variation in Prices of At-Issue Vehicles**

41. To assess whether these results from the academic literature apply to the case at hand, I analyze actual transaction prices of at-issue vehicles. Consistent with the academic literature, I find that transaction prices vary considerably, even for observationally identical vehicles sold at a single dealership.

42. I rely on J.D. Power's Power Information Network ("PIN") database. Academic articles routinely use PIN data to analyze automobile prices.<sup>49</sup> The PIN data contain daily retail transaction data for new and used vehicles collected from transactions at participating automobile dealers across the United States.<sup>50</sup> The PIN data contain an array of variables, such as the transaction date, whether the vehicle is new or used, the price of the vehicle, the vehicle's model-year, vehicle features (such as body type, number of doors, transmission, and number of cylinders), and geographical information on buyers and dealers.<sup>51</sup>

43. I obtained PIN data that include transactions of used and new vehicles across the United States between January 1, 2013 and March 31, 2019 for three Ford models: the Ford Edge, Ford Escape, and Ford Explorer. I focus on these

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<sup>47</sup> Meghan Busse and Jorge Silva-Risso, "One Discriminatory Rent' or 'Double Jeopardy': Multi-component Negotiation for New Car Purchases," *American Economic Review: Papers and Proceedings* 100, no. 2, May 2010, p. 472.

<sup>48</sup> "Keys to Vehicle Leasing," Federal Reserve Board, <https://www.federalreserve.gov/pubs/leasing/resource/different/future.htm>, accessed 5/22/19.

<sup>49</sup> See e.g., James M. Sallee, "The Surprising Incidence of Tax Credits for the Toyota Prius," *American Economic Journal: Economic Policy* 3, no. 2, 2011, pp. 189–219 at p. 192; Adam Copeland, Wendy Dunn, and George Hall, "Inventories and the automobile market," *RAND Journal of Economics* 42, no. 1, 2011, pp. 121–149 at p. 123; Ohjin Kwon et al., "The Informational Role of Product Trade-Ins for Pricing Durable Goods," *The Journal of Industrial Economics* 63, no. 4, 2015, pp. 736–762 at pp. 749–750.

<sup>50</sup> "The Power Information Network (PIN) from J.D. Power provides real-time automotive information and decision support tools based on the collection and analysis of daily new- and used-vehicle retail transaction data from thousands of automotive franchises." "Power Information Network [PIN]," *J.D. Power*, <https://www.jdpower.com/business/solutions/power-information-network-pin>, accessed April 18, 2019. More than 40 percent of franchise dealers in the US participate in PIN. "J.D. Power Offers New Perspective with Residual Values," *J.D. Power*, January 18, 2017, available at <http://www.jdpower.com/press-releases/jd-power-residual-values>, accessed May 6, 2019.

<sup>51</sup> PIN Data. See PIN Explorer Glossary for a detailed description of the information available in the PIN database.

three Ford models since the other three models at-issue (the Lincoln MKS, MKT, and MKX) account for relatively few sales.<sup>52</sup> For example, in 2015, Ford's total sales of Edge, Escape, and Explorer vehicles were almost twenty times higher than the total sales of Lincoln MKS, MKT, and MKX vehicles.<sup>53</sup> In the following analyses of transaction prices, I use the "Vehicle Price Less Customer Cash Rebate" variable in the PIN data.<sup>54</sup>

44. The PIN data do not show whether a given vehicle has a panoramic sunroof.<sup>55</sup> However, for analyses in which I want to focus on vehicles with or without a panoramic sunroof, I am able to use the vehicle's trim level as a proxy for whether the vehicle has a panoramic sunroof. A vehicle's trim level is an industry term referring to a specific combination of vehicle features, such as the type of seats or entertainment system.<sup>56</sup> A higher trim level has more or better features than the entry-level or base trim. Certain trim levels for certain at-issue Ford models always or nearly always have panoramic sunroofs, while others never have panoramic sunroofs. For example, the 2017 Ford Explorer comes in one of five trim levels—Base, XLT, Limited, Sport, and Platinum.<sup>57</sup> The 2017 Explorer Base does not provide a panoramic sunroof option, Platinum

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<sup>52</sup> Gaskin Report, ¶ 5. Mr. Gaskin does not intend to survey owners of the Lincoln models in his conjoint survey. Gaskin Report, ¶ 5. The Lincoln vehicles introduce additional dimensions of heterogeneity, such as any differences between the Lincoln brand and Ford brand.

<sup>53</sup> Ford's sales, including vehicles without PSRs, in the US in 2015 were as follows: 306,492 of the Ford Escape; 124,120 of the Ford Edge; 224,309 of the Explorer; 6,877 of the Lincoln MKS; 22,199 of the Lincoln MKX; and 4,696 of the Lincoln MKT. Ford, <https://corporate.ford.com/content/dam/corporate/en/investors/investor-events/Sales%20Calls/2017/December-2016-Sales-Release-with-tables.pdf>, accessed May 9, 2019.

<sup>54</sup> From the JD Power PIN Data Glossary: "Vehicle Price includes the price of accessories added by the factory and/or retailer and included in the customer's contract. These can include items to be installed subsequent to delivery ("due bill" item). "Accessories" typically include "hard adds" (items which add to the vehicle's book value), such as roof racks, towing packages, wheels, and tires. Vehicle Price does not include the price of aftermarket options (AMOs) such as fabric protectant, antitheft devices, and paint sealants." Additionally, the Vehicle Price includes transportation charges, but "does not include documentary preparation charges (doc fees), taxes, license/title fees, service contracts, or insurance." Cash rebates in the data are defined as the "cash amount given to the customer by the manufacturer and/or retailer, and used toward the purchase or lease of a vehicle." PIN Glossary, pp. 8, 26–27.

<sup>55</sup> I understand that there is no general way to determine whether a given vehicle has a panoramic sunroof upgrade without individual investigation. For example, the PIN data relies on a vehicle's Vehicle Identification Number ("VIN"), which is mandated by the National Highway Traffic Safety Administration, to obtain various vehicle characteristics, including make, model, and engine type. However, the VIN does not encode all available options chosen by the purchaser, such as a sunroof or stereo system. JD Power PIN Data Glossary, p. 43. *See also*, James M. Sallee, "The Surprising Incidence of Tax Credits for the Toyota Prius," *American Economic Journal: Economic Policy* 3, no. 2, 2011, pp. 189–219 at p. 192.

<sup>56</sup> "Trim Levels 101: All About Trims, Styles, Options and Packages," *Edmunds*, May 26, 2017, <https://www.edmunds.com/car-buying/trim-levels-101.html>, accessed May 12, 2019.

<sup>57</sup> Ford, 2017 Explorer Brochure, p. 13, [http://www.auto-brochures.com/makes/Ford/Explorer/Ford\\_USExplorer\\_2017.pdf](http://www.auto-brochures.com/makes/Ford/Explorer/Ford_USExplorer_2017.pdf), accessed May 12, 2019.



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54. Mr. Weir contends that such a class member would still be harmed, because he claims that the initial owner would recover *only* a portion of the alleged initial overpayment at the time of selling the car (and the second owner of the car would also incur harm).<sup>67</sup> Specifically, he asserts that any alleged initial overpayment would be divided between the two individuals who participated in this transaction,<sup>68</sup> but his logic assumes that there was an initial overpayment due to the Challenged Conduct.<sup>69</sup> This is an empirical question that requires empirical analysis, which Mr. Weir has not performed. As I show in Section 4, the real-world market data do not show an impact of the alleged defect on market prices. Additionally, he has also not proposed a method to apportion any alleged initial overpayment between multiple class members who owned a given at-issue vehicle at different points in time.

### ***3.4. MSRPs do not Represent Prices Paid by Individual Class Members or the Average Price Paid by Class Members***

55. In lieu of using prices from actual transactions, Plaintiffs' experts rely on MSRPs in parts of their analysis. For example, Mr. Gaskin uses MSRPs in choosing the price points for his conjoint survey.<sup>70</sup> He asserts that MSRP is an accurate proxy for the actual price paid by consumers,<sup>71</sup> but provides no support in his report. He further claims that by using MSRPs, he somehow used "actual market prices that prevailed during the Class Periods."<sup>72</sup>

56. However, MSRP is not an accurate proxy for the actual price. In general, the MSRP far exceeds transaction prices.<sup>73</sup> This is also true for vehicles at issue in this case. For example, the MSRP for the 2017 Ford Explorer Platinum was

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<sup>67</sup> Weir Deposition, pp. 83:18–84:3, 86:20–25 ("So everybody is impacted by the mere presence of the defect, not its manifestation.... So the person in your hypothetical will have paid too much for that vehicle at retail and then will pass along a portion of that damage to the person who becomes the secondary buyer of the used vehicle... [I]n a situation where someone resells the vehicle, they have basically experienced a loss of that overpayment as the vehicle depreciates, and then they pass on a portion of that loss to the next owner of the car.")

<sup>68</sup> That is, the initial owner of an at-issue vehicle would absorb some fraction of the alleged initial overpayment, with the fraction depending on the depreciation in the value of the panoramic sunroof prior to its sale to the second owner. For example, if the value of the panoramic sunroof does not depreciate, the alleged damage would be fully transferred to the next owner. On the other hand, if the value of the panoramic sunroof is completely depreciated prior to the sale of the at-issue vehicle, the first owner would absorb the full alleged damage and the second owner would not be damaged.

<sup>69</sup> Weir Deposition, pp. 83:18–84:3 ("So everybody is impacted by the mere presence of the defect, not its manifestation.... So the person in your hypothetical will have paid too much for that vehicle at retail and then will pass along a portion of that damage to the person who becomes the secondary buyer of the used vehicle.")

<sup>70</sup> Gaskin Report, ¶ 23.

<sup>71</sup> Gaskin Deposition, p. 109:1–2.

<sup>72</sup> Gaskin Report, ¶ 22.

<sup>73</sup> For example, Consumer Reports states that "you can generally buy a vehicle for less than the sticker price," which it defines as the total MSRP. Consumer Reports, Guide to Car Pricing Terms, August 1, 2017, <https://www.consumerreports.org/car-pricing-negotiation/guide-to-car-pricing-terms/>, accessed May 6, 2019.



\$54,180 with no optional add-ons.<sup>74</sup> However, in the PIN data, in January 2017, the average transaction price nationwide for a new 2017 Ford Explorer Platinum was \$50,796.<sup>75</sup> Some transaction prices were even below \$48,000. This shows that the MSRP is not an accurate proxy for prices paid by individual class members or even the average price paid by class members.

#### **4. TRANSACTION DATA SHOW THAT AT-ISSUE VEHICLES RETAIN THEIR VALUE AT LEAST AS WELL AS COMPARABLE VEHICLES**

57. As described above, Mr. Gaskin's assignment was "to design and describe a market research survey and analysis that would ... assess the reduction in market value resulting from the defect in the panoramic vista roofs,"<sup>76</sup> which Mr. Weir intends to rely upon to calculate overpayment damages. Plaintiffs' experts contend that analyzing actual market data would not be useful.<sup>77</sup> Contrary to the claims of Plaintiffs' experts, actual market data provide useful real-world evidence on whether the prices of at-issue vehicles were systematically lower than prices of comparison vehicles, as Plaintiffs' theory of harm asserts.

58. If Plaintiffs' theory of harm were correct, one would expect the prices of at-issue vehicles to be systematically lower for two reasons. First, to the extent that owners of Ford vehicles with panoramic sunroofs were experiencing the defect, they would be more interested in selling their vehicle and/or willing to accept a lower price. That is, the supply of used at-issue Ford vehicles with panoramic sunroofs would increase, leading to a price decrease. Second, to the extent that owners of Ford vehicles were experiencing the defect, news about the defect may trickle out in chat rooms, product reviews, or in the news. This would reduce consumer demand for at-issue Ford vehicles with panoramic sunroofs, which would reduce prices. In summary, if Plaintiff's theory of harm

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<sup>74</sup> <https://web.archive.org/web/20161202012643/http://www.kbb.com/ford/explorer/2017/platinum/#>

<sup>75</sup> This number understates the difference between the MSRP and transaction prices since some of the vehicles in the PIN data would have costly optional add-ons, but the PIN data lacks information on some add-ons.

<sup>76</sup> Gaskin Report, ¶ 4.

<sup>77</sup> Mr. Weir stated this position in his deposition: "Q: Are there any non-survey-based methodologies that can be utilized to calculate overpayment damages? A: Given that my task is to develop overpayment damages at the time and point of first sale, and there is no market data that reflects a disclosure to consumers at the time and point of first sale of the defect, and even to this day, that Ford denies that there even is a defect, I don't think there are non-survey-based methods that would be suitable in this arena." He also stated, "since there's been no experience that I'm aware of where Ford admitted the defect and told consumers about it when they purchased their vehicles, there would be no market data that would reflect that condition that could be used to measure the damages in this case." Weir Deposition, pp. 98:5–99:19.

were true, there would be supply-side and/or demand-side shifts that would lead to lower prices for the at-issue vehicles. Thus, if prices of used at-issue Ford vehicles do not decline relative to prices of appropriate comparison vehicles, it suggests that the alleged defect did not move market prices.

59. In this section, I present my analysis of prices of at-issue vehicles versus prices of comparison vehicles. I set aside the price variation observed in individual transactions discussed in Section 3 and analyze average prices in this section. Previewing the findings of my five analyses, the bulk of the evidence contradicts Plaintiffs' claims, since at-issue vehicles tend to retain their value at least as well over time as comparison vehicles. That is, at-issue vehicles do not depreciate more rapidly. In summary, across these five analyses, I do not find evidence of uniform impact or even an overall impact of the alleged defect.

#### ***4.1. Methodology***

60. For this analysis, I again rely on the PIN data. As discussed earlier, the PIN data do not show whether a given vehicle has a panoramic sunroof, but do show the trim level, which is a proxy for whether or not a given vehicle has a panoramic sunroof. There are four specific trim levels with a high percentage of panoramic sunroofs ("at-issue groups"): Ford Edge Sport, Ford Escape Titanium, Ford Explorer Platinum, and Ford Explorer Sport.<sup>78</sup>

61. Given that prices of used vehicles generally decline over time, it is necessary to have an appropriate comparison vehicle without the alleged defect to serve as a benchmark. I use two methods of constructing comparison groups. First, I use the same model and year, but a trim level without a panoramic sunroof option, so that none of the vehicles have the alleged defect.<sup>79</sup> For example, I compare the Ford Escape Titanium (at-issue group) to the Ford Escape S (comparison group). This method ensures that the comparison group is similar to the at-issue group along several dimensions, including the make (Ford), model, year, and body type (Sport Utility).

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<sup>78</sup> Ford Market Offering Complexity Analysis of Panoramic Sunroofs for Edge, Escape and Explorer.

<sup>79</sup> I rely on Ford brochures for various model-trims to identify a trim within each model that does not offer panoramic sunroof as an option.

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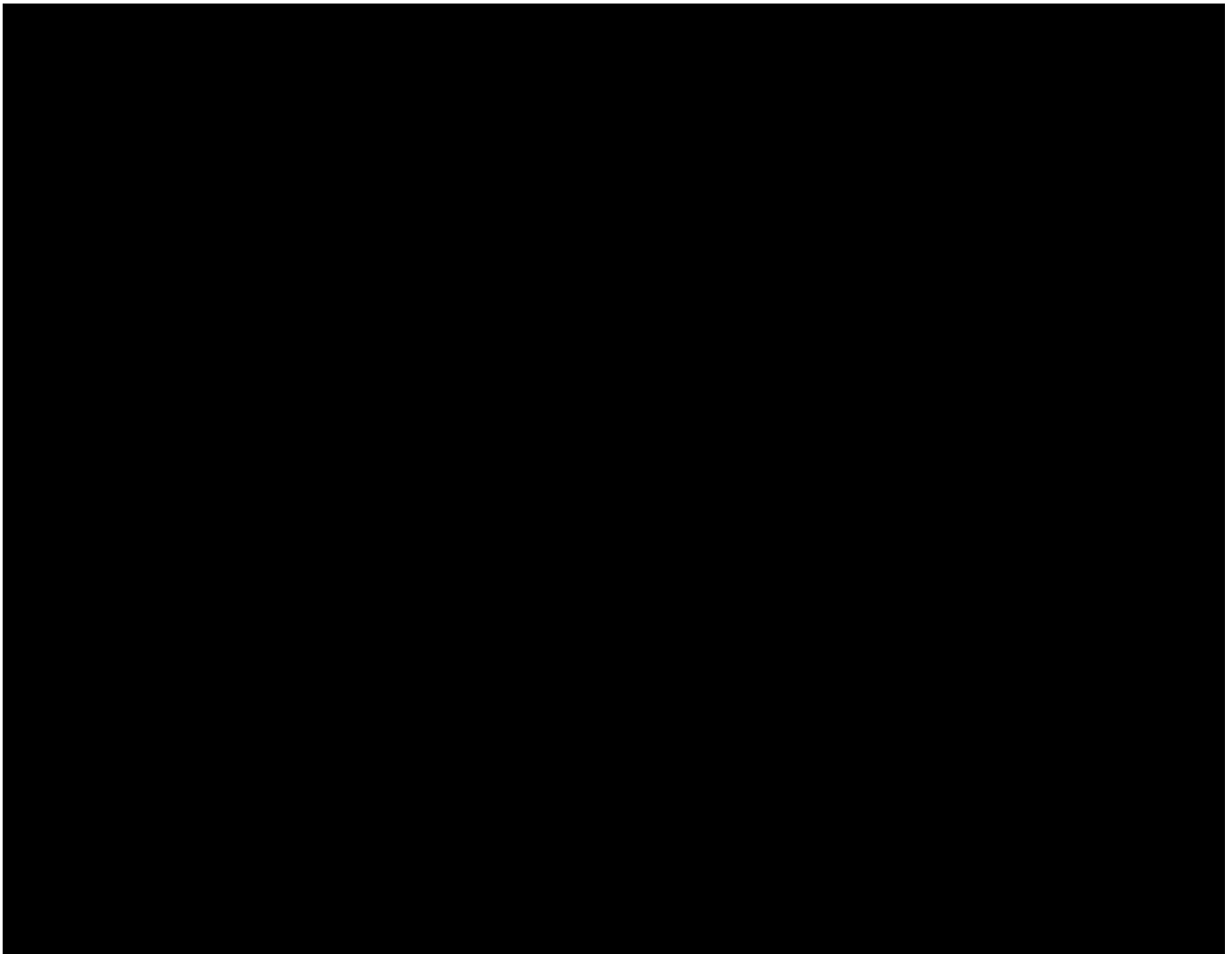
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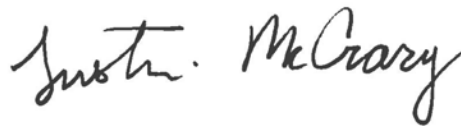


## 5. CONCLUSION

71. Plaintiffs' experts have not attempted to put forth an approach that can determine the harm experienced by individual class members due to the Challenged Conduct. It is incorrect to assume that class members would be uniformly impacted, due to the various individualized factors that impact automobile prices, as described in the academic literature and documented in my analysis of the transaction data of at-issue vehicles. Plaintiffs' experts have ignored this real-world market data and used an approach that masks the heterogeneity across class members.

72. Setting aside issues of heterogeneity among class members, Plaintiffs' experts have also failed to provide a method that can quantify the class-wide harm due to the Challenged Conduct. Their approach fails to account for supply-side factors and ignores market data, among other flaws. In fact, as shown in my five case studies of at-issue vehicles versus comparison vehicles, the market data do not support Plaintiffs' claim that there would be class-wide harm from the Challenged Conduct.

Executed this 24<sup>th</sup> day of May, 2019

A handwritten signature in black ink that reads "Justin. McCrary". The signature is written in a cursive, slightly informal style.

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Justin McCrary, Ph.D.

**Appendix A**

# Justin McCrary

Columbia University  
 School of Law  
 521 Jerome Greene Hall  
 New York, NY 10027

Cell Phone: (510) 409-6418  
 Email: [justin.mccrary@gmail.com](mailto:justin.mccrary@gmail.com)  
 Homepage: <https://www.law.columbia.edu/faculty/justin-mccrary>

University of California, Berkeley  
 School of Law  
 586 Simon Hall  
 Berkeley, CA 94708

## Current Appointments

2018– Columbia University  
 Paul J. Evanson Professor of Law

2010– University of California, Berkeley  
 Professor of Law

2008–10 Assistant Professor of Law

2012– National Bureau of Economic Research  
 Faculty Research Associate

2006–12 Faculty Research Fellow

## Past Appointments

Fall 2017 Columbia University  
 Samuel Rubin Visiting Professor of Law

2014–17 University of California, Berkeley  
 Director, Social Sciences Data Laboratory (D-Lab)

2013–14 European Central Bank (Banco de España)  
 Economist

2003–07 University of Michigan  
 Assistant Professor, Gerald R. Ford School of Public Policy  
 Assistant Professor, Department of Economics (courtesy)

1996–98 Federal Reserve Bank of New York  
 Assistant Economist

## Education

Ph.D. Economics, University of California, Berkeley, 2003

A.B. Public Policy, Princeton University, 1996

## Testimony Experience

*Financial Guaranty Insurance Company v. Morgan Stanley ABS Capital I Inc. and Morgan Stanley Mortgage Capital Holdings LLC, as successor to Morgan Stanley Mortgage Capital Inc.*

Supreme Court of the State of New York, County of New York

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley

Deposed on May 15, 2019

Report filed on October 19, 2018

*Cuyahoga County v. Purdue Pharma LP, et al., and Summit County v. Purdue Pharma LP, et al.,*

U.S. District Court of the Northern District of Ohio

Prescription opioid medication litigation

Testimony regarding causation, drug use, economics of crime, regression methodology

Retained by Endo Pharmaceuticals Inc., Endo Health Solutions Inc., Par Pharmaceutical, Inc., and Par Pharmaceuticals, Inc.

Rebuttal report filed on May 10, 2019

*Rebuttal Testimony of Powerex Corp re: BPA Southern Intertie Hourly Rate*

U.S. Department of Energy, Bonneville Power Administration

Administrative proceeding concerning the rates for transmission of electricity

Testimony regarding regression methodology

Retained by Powerex Corp.

Testimony before the Hearing Officer on April 23, 2019

Rebuttal report filed on March 28, 2019

*Lerman v. Apple Inc.*

U.S. District Court for the Eastern District of New York

Putative class action regarding products liability

Testimony regarding heterogeneity across putative class members, the nature of products, and conjoint analysis

Retained by Apple, Inc.

Rebuttal report filed on April 3, 2019

*In re Foreign Exchange Benchmark Rates Antitrust Litigation*

U.S. District Court for the Southern District of New York

Antitrust price fixing case (Sherman Act §§ 1, 3 and Commodity Exchange Act)

Testimony regarding trader communications and sampling methodologies

Retained by Credit Suisse

Deposed on January 17, 2019

Rebuttal report filed on October 25, 2018

## Appendix A

*Financial Guaranty Insurance Company v. Morgan Stanley ABS Capital I Inc., Morgan Stanley Mortgage Capital Holdings LLC, Morgan Stanley & Co. LLC, as successor to Morgan Stanley & Co. Inc., Morgan Stanley, and Saxon Mortgage Services, Inc.*

Supreme Court of the State of New York, County of New York

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley

Deposed on January 8, 2019

Report filed on August 7, 2018

*Trinidad Lopez v. Liberty Mutual Insurance Company*

U.S. District Court for the Central District of California

Wage and hour case after class certification

Testimony regarding damages and statistics

Retained by Liberty Mutual

Rebuttal report filed on December 21, 2018

*Samsung Electronics Co., Ltd., v. Kuroda Electric Co., Ltd., Sakai Display Products Corporation and Sharp Corporation*

International Chamber of Commerce

Contractual dispute regarding supply of television panels

Testimony regarding economic theory, data science, statistics

Retained by Samsung Electronics Co.

Testified at arbitration hearing on December 20, 2018

Rebuttal report filed on September 28, 2018

*In re: Part 60 RMBS Put-Back Litigation*

Supreme Court of the State of New York, County of New York

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley Mortgage Capital Holdings LLC

Deposed on November 27, 2018

Rebuttal report filed on June 22, 2018

*In Re: RFC and ResCap Liquidating Trust Litigation*

U.S. District Court for the District of Minnesota and

U.S. Bankruptcy Court for the Southern District of New York

Mortgage-backed securities case

Testimony regarding sampling, damages, and statistical concepts

Retained by Advanced Financial Services, BMO Harris Bank, Cadence Bank, Colonial Savings, CTX Mortgage, Decision One, First Guaranty, Freedom Mortgage, Home Loan Center, HSBC Mortgage, Impac Funding, PNC, Provident, Standard Pacific, Synovus, and Universal American

Testified at jury trial on November 1, 2018 (Minnesota; Home Loan Center)

Final rebuttal report filed on June 14, 2018

Deposed on April 24, 2018

Rebuttal to supplemental disclosure filed on February 26, 2018

Rebuttal report filed on October 27, 2017

## Appendix A

*Shamrell v. Apple Inc.*

Superior Court of the State of California, County of San Diego

Putative class action regarding products liability, Unfair Competition Law and Consumers Legal Remedies Act

Testimony regarding heterogeneity across putative class members, failure rate methodologies, econometrics, and data science

Retained by Apple, Inc.

Supplemental class certification report filed on October 17, 2018

Class certification report filed on March 29, 2017

Rebuttal report filed on February 1, 2017

*Residential Funding Company v. Universal American Mortgage Co.*

United States District Court for the District of Minnesota

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Universal American Mortgage Co.

Rebuttal report filed on August 30, 2018

*In re Gateway Plaza Residents Litigation*

Supreme Court of the State of New York, County of New York

Putative class action regarding warranty of habitability

Testimony regarding electricity usage, individual preferences and choices, and heterogeneity across putative class members; large scale data analysis

Retained by Gateway Plaza

Supplemental class certification and rebuttal report filed on August 8, 2018

Class certification report filed on September 18, 2017

*United States of America v. SavaSeniorCare*

U.S. District Court for the Middle District of Tennessee

False Claims Act case

Testimony regarding sampling and statistical methods

Retained by SavaSeniorCare

Rebuttal report filed on August 6, 2018

*Latoya Brown et al. v. Madison County, Mississippi*

U.S. District Court for the Southern District of Mississippi

Putative class action alleging violations of Section 1983 and the Fourth and Fourteenth Amendments

Testimony regarding regression methodologies, measurement error, and data science

Retained by Latoya Brown et al.

Report filed on July 2, 2018

*Martin Dulberg et al. v. Uber Technologies, Inc. and Rasier, LLC*

U.S. District Court for the Northern District of California

Putative class action alleging breach of contract

Testimony regarding heterogeneity in damages across putative class members

Retained by Uber Technologies, Inc.

Supplemental report filed on June 28, 2018

Affirmative report filed on January 11, 2018

*Tri-City, LLC; Endor Car and Driver, LLC; Zehn-NY, LLC; Zwei-NY, LLC; Abatar, LLC; and Flatiron Transit, LLC v. New York Taxi and Limousine Commission and Meera Joshi*

Supreme Court of the State of New York, County of New York

Article 78 proceeding challenging an administrative ruling

Testimony regarding mismatch between accessibility regulation and accessibility demand

Retained by plaintiffs

Supplemental report filed on May 18, 2018

Affirmative report filed on April 13, 2018

*Federal Home Loan Bank of Boston, v. Ally Financial, Inc., et al.*

Superior Court of the State of Massachusetts, Business Litigation Session, Suffolk County

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley

Rebuttal report filed on May 17, 2018

*Cheryl Phipps and Shawn Gibbons v. Wal-Mart Stores, Inc.*

United States District Court for the Middle District of Tennessee

Putative class action alleging discrimination in employment

Testimony regarding the decentralized nature of Walmart's internal labor market and concomitant heterogeneity across proposed class members in pay and promotion outcomes

Retained by Walmart

Deposed on April 30, 2018

Rebuttal report filed on April 20, 2018

*People of the State of California v. Morgan Stanley & Co.*

Superior Court of the State of California, County of San Francisco

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley & Co.

Deposed on February 9, 2018

Rebuttal report filed on January 25, 2018

*Tony Dickey and Paul Parmer et al. v. Advanced Micro Devices, Inc.*

U.S. District Court for the Northern District of California

Putative class action alleging false advertising

Testimony regarding availability of information regarding and market for computer chips and heterogeneity across putative class members

Retained by Advanced Micro Devices

Rebuttal report filed on January 26, 2018

*Federal Home Loan Bank of Chicago v. Banc of America Funding Corporation, et al.*

Circuit Court of Cook County, Illinois, County Department, Chancery Division

Mortgage-backed securities case

Testimony regarding sampling, regression, and statistical methods

Retained by Morgan Stanley

Deposed on December 14, 2017

Rebuttal report filed on August 21, 2017

*In re Lehman Brothers Holdings, Inc., et al., Debtors*

U.S. Bankruptcy Court for the Southern District of New York

Mortgage-backed securities case

Testimony regarding sampling, resampling methods for inference, and statistical methods

Retained by Lehman Brothers Holdings, Inc.

Deposed on October 9, 2017

Rebuttal report filed on August 28, 2017

*Deutsche Bank National Trust Company v. Morgan Stanley Mortgage Capital Holdings LLC*

U.S. District Court for the Southern District of New York

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley Mortgage Capital Holdings LLC

Deposed on March 27, 2017

Rebuttal report filed on December 16, 2016

*Rosen v. Uber Technologies, Inc.*

U.S. District Court for the Northern District of California

Putative class action regarding false advertising

Testimony regarding economics of safety

Retained by Uber Technologies, Inc.

Deposed on February 3, 2017

Rebuttal report filed on January 13, 2017

Affirmative report filed on December 2, 2016

*Blackrock Allocation Target Shares: Series S Portfolio, et al., v. Wells Fargo Bank, N.A.; Royal Park Investments SA/NV v. Wells Fargo Bank, N.A., as Trustee; National Credit Union Administration Board, et al., v. Wells Fargo Bank, N.A.; Phoenix Light SF Limited, et al., v. Wells Fargo Bank, N.A.; and Commerzbank AG v. Wells Fargo Bank, N.A.*

U.S. District Court for the Southern District of New York

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Wells Fargo Bank

Report filed on January 18, 2017

*LA Taxi Cooperative, Inc. et al. v. Uber Technologies, Inc.*

U.S. District Court for the Northern District of California

False advertising case

Testimony regarding economics of safety

Retained by Uber Technologies, Inc.

Rebuttal report filed on January 13, 2017

Affirmative report filed on November 18, 2016

*State of Illinois v. Hitachi Ltd., et al.*

Circuit Court of Cook County, Illinois, County Department, Chancery Division

Antitrust price-fixing case

Testimony regarding liability and damages

Retained by Hitachi Ltd.

Report filed on November 11, 2016

## Appendix A

*In re: City of San Bernardino, California, Debtor*

U.S. Bankruptcy Court, Central District of California, Riverside Division

Municipal bankruptcy case

Testimony regarding economics, econometrics, rare risks and the value of a statistical life

Retained by the City of San Bernardino

Report filed on October 3, 2016

*U.S. Bank National Association v. Morgan Stanley Mortgage Capital Holdings LLC*

Supreme Court of the State of New York, County of New York

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by Morgan Stanley Mortgage Capital Holdings LLC

Deposed on September 10, 2016

Report filed on June 17, 2016

*National Credit Union Administration Board v. RBS Securities, Inc.*

U.S. District Court for the Central District of California &

U.S. District Court for the District of Kansas

Mortgage-backed securities case

Testimony regarding sampling and statistical methods

Retained by RBS Securities

Deposed on January 28, 2016

Report filed on October 16, 2015

*Temple-Inland, Inc., v. Thomas Cook, et al.*

U.S. District Court for the District of Delaware

Escheat law case

Testimony regarding sampling, statistical methods, and economic theory

Retained by the State of Delaware

Deposed on November 24, 2015

Report filed on October 23, 2015

*National Consumer Protection Service v. Farmacias Cruz Verde S.A. et al.*

Honorable Civil Court of Santiago (Chile)

Antitrust putative class action

Testimony regarding appropriate methods for estimating damages

Retained by Salcobrand

Report filed on November 14, 2015

*Douglas O'Connor, et al., v. Uber Technologies, Inc.*

U.S. District Court for the Northern District of California

Putative class action regarding independent contractor versus employee

Testimony regarding heterogeneity in alleged damages across putative class members, potential for class conflict

Retained by Uber Technologies, Inc.

Report filed on October 27, 2015

Report filed on July 7, 2015



*Students for Fair Admissions, Inc. v. President and Fellows of Harvard College*  
U.S. District Court for the District of Massachusetts  
Discovery dispute in affirmative action case  
Testimony regarding necessary inputs into statistical methodologies  
Retained by Harvard College  
Report filed on July 30, 2015

*Securities and Exchange Commission v. James V. Mazzo and David L. Parker*  
U.S. District Court for the Central District of California  
Civil insider trading suit  
Testimony regarding probability theory and statistics  
Retained by James V. Mazzo and David L. Parker  
Deposed on May 13, 2015  
Report filed on March 13, 2015

*In re: City of Stockton, California, Debtor*  
U.S. Bankruptcy Court, Eastern District of California  
Municipal bankruptcy suit  
Testimony regarding economic theory, labor economics, and econometrics  
Retained by the City of Stockton  
Deposed on March 13, 2013  
Report filed on February 15, 2013

*In the Matter of Act 111 Interest Arbitration Between Commonwealth of Pennsylvania and Pennsylvania State Troopers Association*  
Hearings on wage setting  
Testimony regarding rare risks and the value of a statistical life  
Retained by the Pennsylvania State Troopers Association  
Testified at arbitration hearing on December 4, 2012  
Report filed on December 4, 2012

## Scholarship on Sampling, Statistics, and Econometrics

Conservative Tests Under Satisficing Models of Publication Bias (with Garret Christensen and Daniele Fanelli)  
*PLOS One*, Volume 11, Number 2, February 22, 2016  
New Evidence on the Finite Sample Properties of Propensity Score Matching and Reweighting Estimators (with Matias Busso and John DiNardo)  
*Review of Economics and Statistics*, Volume 96, Number 5, December 2014  
Incomes in South Africa Since the Fall of Apartheid (with Murray Leibbrandt and James Levinsohn)  
*Journal of Globalization and Development*, Volume 1, Issue 1, January 2010  
Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test  
*Journal of Econometrics*, Volume 142, Issue 2, February 2008

## Scholarship on Competition

Measuring Benchmark Damages in Antitrust Litigation (with Daniel L. Rubinfeld)  
*Journal of Econometric Methods*, Volume 3, January 2014

## Scholarship on Finance

Dark Trading at the Midpoint: Pricing Rules, Order Flow, and Price Discovery (with Robert Bartlett)  
Accepted, *Journal of Law, Finance, and Accounting*

How Rigged Are Stock Markets?: Evidence from Microsecond Timestamps (with Robert Bartlett)  
Conditionally Accepted, *Journal of Financial Markets*

Subsidizing Liquidity with Wider Ticks: Evidence from the Tick Size Pilot Study Timestamps (with Robert Bartlett)  
Conditionally Accepted, *Journal of Empirical Legal Studies*

Shall We Haggle in Pennies at the Speed of Light or in Nickels in the Dark?: How Minimum Price Variation Regulates High Frequency Trading and Dark Liquidity (working paper, 2015, with Robert Bartlett)

## Scholarship on Risk and Crime

Are U.S. Cities Underpoliced? Theory and Evidence (with Aaron Chalfin)  
*Review of Economics and Statistics*, Volume 100, Issue 1, March 2018, 167–186

Criminal Deterrence: A Review of the Literature (with Aaron Chalfin)  
*Journal of Economic Literature*, Volume 55, Number 1, March 2017, 5–48 (lead article)

The Deterrence Effect of Prison: Dynamic Theory and Evidence (with David S. Lee)  
*Advances in Econometrics*, Volume 38, 2017, editors Matias D. Cattaneo and Juan Carlos Escanciano  
2018 Emerald Literati Award, Outstanding Author Contribution

Do Sexually Violent Predator Laws Violate Double Jeopardy or Substantive Due Process: An Empirical Inquiry (with Tamara Lave)  
*Brooklyn Law Review*, Volume 78, Summer 2013, Number 4, 1391–1439

General Equilibrium Effects of Prison on Crime: Evidence From International Comparisons (with Sarath Sanga)  
*Cato Papers on Public Policy*, Volume 2, 2012

*Controlling Crime: Strategies and Tradeoffs* (co-edited with Phil Cook and Jens Ludwig), Chicago: University of Chicago Press, 2011.

## Scholarship on Labor Economics

Unmarked? Criminal Record Clearing and Employment Outcomes (with Jeffrey Selbin (lead author) and Joshua Epstein)  
*Journal of Criminal Law and Criminology*, Volume 108, Number 1, 2017 (lead article)

The Effect of Female Education on Fertility and Infant Health: Evidence from School Entry Laws Using Exact Date of Birth (with Heather Royer)  
*American Economic Review*, Volume 101, Number 1, February 2011

Comment on “Free to Punish? The American Dream and the Harsh Treatment of Criminals”, by Rafael di Tella and Juan Dubra  
*Cato Papers on Public Policy*, Volume 1, 2011

Dynamic Perspectives on Crime  
in *Handbook of the Economics of Crime*, Chapter 4, Edward Elgar, 2010

The Effect of Court-Ordered Hiring Quotas on the Composition and Quality of Police  
*American Economic Review*, Volume 97, Number 1, March 2007

Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime: Comment  
*American Economic Review*, Volume 92, Number 4, September 2002

## Other Scholarship

The Ph.D. Rises in American Law Schools, 1960-2011: What Does It Mean for Legal Education? (with Joy Milligan and James Phillips)

*Journal of Legal Education*, Volume 65, Number 543, Spring 2016

Following Germany's Lead: Using International Monetary Linkages to Estimate the Effect of Monetary Policy on the Economy (with Julian di Giovanni and Till von Wachter)

*Review of Economics and Statistics*, Volume 91, Number 2, May 2009

## Other Activities

2017– Member, Board of Directors, American Law and Economics Association

2007– Co-Director (with Phil Cook and Jens Ludwig), *Crime Working Group*, National Bureau of Economic Research

2009–2014 Co-Director, *Law and Economics Program*, University of California, Berkeley

## Courses Taught

### *Columbia*

2018-2019 L6916: Litigation, Economics, and Statistics (Fall); L6231: Corporations (Spring)

2017-2018 L6231: Corporations (Fall)

### *Berkeley*

2016-2017 Law 244.4: Litigation and Statistics (Fall); Law 216: Law and Economics Workshop (Fall); Law 218.6: Law and Economics of Discrimination (Fall)

2015-2016 Law 250: Business Associations (Fall); Law 244.4: Litigation and Statistics (Fall); Letters and Science 39D: Race, Policing, and Data Science (Fall)

2014-2015 Law 250: Business Associations (Fall); Law 250S: Business Associations (Summer)

2013-2014 Law 250S: Business Associations (Summer)

2012-2013 Law 250: Business Associations (Fall); Law 250S: Business Associations (Summer); Law 209.3: Introductory Statistics (Fall)

2011-2012 Law 250: Business Associations (Fall); Law 250S: Business Associations (Summer); Law 209.3: Introductory Statistics (Fall); Law 251.31: Introduction to Law, Economics, and Business (Spring); Legal Studies 145: Law and Economics I (undergraduate)

2010-2011 Law 250: Business Associations (Fall); Law 250S: Business Associations (Summer); Law 216: Law and Economics Workshop (Fall and Spring); Legal Studies 145: Law and Economics I (undergraduate); Law 209.6: Topic in Quantitative Methods (JSP); Econ 250C: Labor Economics (graduate, shared course with 209.6)

2009–2010 Law 216: Law and Economics Workshop (Fall and Spring); Law 209.32: Quantitative Methods II (JSP)

2008–2009 Legal Studies 145: Law and Economics I (undergraduate); Law 209.3: Quantitative Methods I (JSP); Law 209.32: Quantitative Methods II (JSP)

2007–2008 Legal Studies 145: Law and Economics I (undergraduate); Law 209.3: Quantitative Methods I (JSP)

### *Michigan*

Introduction to Quantitative Methods (policy), First Econometrics Field Course (economics), Advanced Economic Theory (policy)

## Grants and Fellowships

- 2007–2010 NIH, Constructive Proposals for Dealing With Attrition (with John DiNardo)
- 2009 Committee on Research, Junior Faculty Research Grant, UC Berkeley
- 2006–2009 NIH, The Effect of Female Education on Fertility and Infant Health (with Heather Royer, Grant # R03 HD051713)
- 2006–2011 NSF, New Instrumental Variables Estimates of the Effects of Schooling and Military Service: Empirical Strategies Using Non-Public-Use Data (with Josh Angrist and Stacey Chen)
- 2005 RWJ Foundation Health and Society Scholars Program, Small Grant Program
- 2004 Rackham Interdisciplinary Grant, University of Michigan
- 2004 CLOSUP Grant, University of Michigan
- 2004 National Poverty Center Grant, University of Michigan
- 2002–2003 Chancellor's Dissertation Year Fellowship, UC Berkeley

## Presentations

- 2018–2019 Columbia University, School of Law; Conference on Empirical Legal Studies, University of Michigan
- 2017–2018 Columbia University, School of Law; Georgetown University, School of Law
- 2016–2017 George Mason University, School of Law; University of Michigan, Economics Department (Summer, Fall); Equities Leaders Summit; University of Zürich, Department of Economics; ETH (Swiss Federal Institute of Technology) Zürich, Law and Economics; Northwestern University, School of Law; Duke University, School of Law; Duke University, Information Initiative
- 2015–2016 Goldman Sachs; University of California, Berkeley, School of Law; University of Virginia, School of Law; University of California, Irvine; Equal Employment Opportunity Commission; National Bureau of Economic Research, Summer Institute
- 2014–2015 Duke University; Federal Reserve Bank of New York; Equal Employment Opportunity Commission (EEO-DataNet); American Law and Economics Association (discussant); New York University (NYU / Penn Law and Finance Conference); National Bureau of Economic Research, Summer Institute (discussant)
- 2013–2014 University of Southern California, School of Law; London School of Economics; Bank of Spain; CEMFI; Carlos III; University of Zaragoza; University of Rotterdam; University of Maastricht; University of Göteborg
- 2012–2013 University of California, Los Angeles, School of Law
- 2011–2012 University of Oregon, Department of Economics; University of British Columbia, Department of Economics; Brown University, Department of Economics; University of Rochester, Department of Economics; Cato Institute; National Bureau of Economic Research, Summer Institute; Harvard Law School
- 2010–2011 Northwestern, School of Law; University of Wisconsin, Department of Economics; Brookings Institution; Cato Institute
- 2009–2010 University of Chicago, School of Law; Cornell University, School of Law and Department of Economics; University of Michigan, School of Law and Department of Economics; University of Virginia, School of Law, Olin Conference
- 2008–2009 University of California, Los Angeles, School of Law; University of Arizona, School of Law and Department of Economics; Stanford University, School of Law and Department of Economics; University of Miami, Department of Economics
- 2007–2008 Northwestern University, School of Law; University of Michigan, Department of Economics; National Bureau of Economic Research, Summer Institute; Florida State University

## Appendix A

*Prior to 2007–2008, presentations are at departments of economics, unless otherwise noted*

- 2006–2007 University of Michigan, Program in Survey Methodology; Public Policy Institute of California; Brown University
- 2005–2006 University of Michigan; University of California, Irvine; University of California, Santa Barbara; University of California, Santa Cruz; California State University, Long Beach; University of Western Ontario; University of Toronto; University of Illinois, Chicago; University of Chicago, Graduate School of Business; APPAM; University of Florida; University of California, Berkeley, School of Law; Princeton University; RAND; Hebrew University (conference in honor of Reuben Gronau); Stanford University, University of Wisconsin, Madison; Northwestern University; Crime and Economics Summer Workshop, University of Maryland
- 2004–2005 Federal Reserve Bank of Chicago; University of Illinois, Urbana-Champaign; University of Michigan, William Davidson Institute; University of Maryland; Urban Institute; American Economics Association Meetings; City University of New York Health Economics Seminar; University of Wisconsin, Madison; Stanford University; University of California, Davis; University of California, Berkeley, Labor Lunch; NBER Summer Institute, Education/Labor Studies
- 2003–2004 University of Michigan; APPAM; NBER Labor Studies Meeting (Fall); Massachusetts Institute of Technology; Harvard University, Kennedy School; University of California, Los Angeles; University of California, San Diego; Columbia University; University of California, Berkeley; NBER Summer Institute, Monetary Policy; NBER Summer Institute, Labor Studies
- 2002–2003 University of California, San Diego; University of California, Los Angeles; RAND Institute; University of Chicago, Graduate School of Business; University of Chicago, Harris School of Public Policy; University of Michigan, Ford School of Public Policy; Columbia University; Dartmouth College; Federal Reserve Bank of New York; Boston University

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**Appendix B****Documents Considered by Justin McCrary**

<b>Document Title</b>	<b>Document Date</b>
<b><u>Legal Pleadings</u></b>	
Class Action Complaint, <i>Jacob Beaty and Jessica Beaty vs. Ford Motor Company</i>	March 16, 2017
Stipulated Motion to Amend the Class Definition And Proposed Order, <i>Jacob Beaty and Jessica Beaty vs. Ford Motor Company</i>	March 27, 2019
<b><u>Depositions, including Exhibits</u></b>	
Deposition of Steven P. Gaskin	March 26, 2019
Deposition of Colin Weir	March 28, 2019
Deposition of Jacob Beaty, Vol. 1	May 14, 2019
Deposition of Jacob Beaty, Vol. 2	May 15, 2019
Deposition of Jessica M. Beaty	May 15, 2019
<b><u>Expert Reports</u></b>	
Expert Report of Colin B. Weir	February 22, 2019
Expert Report of Neil Hannemann	February 22, 2019
Expert Report of Steven P. Gaskin	February 22, 2019
<b><u>Public Press, Academic Articles, and Publicly Available Documents</u></b>	
“2017 Explorer Brochure,” Ford, <a href="http://www.autobrochures.com/makes/Ford/Explorer/Ford_US%20Explorer_2017.pdf">http://www.autobrochures.com/makes/Ford/Explorer/Ford_US%20Explorer_2017.pdf</a>	
“2017 Ford Explorer Model Overview,” <i>Motortrend</i> , <a href="https://www.motortrend.com/cars/ford/explorer/2017/">https://www.motortrend.com/cars/ford/explorer/2017/</a>	
“2017 Ford Explorer Pricing,” <i>Kelley Blue Book</i> , <a href="https://web.archive.org/web/20161202012643/http://www.kbb.com/ford/explorer/2017/platinum/#">https://web.archive.org/web/20161202012643/http://www.kbb.com/ford/explorer/2017/platinum/#</a>	

## Appendix B

## Documents Considered by Justin McCrary

Document Title	Document Date
“Ford U.S. December Retail Sales up 5 Percent – a 12-Year High; Ford America’s Best-Selling Brand for Seventh Year,” <i>Ford</i> , <a href="https://corporate.ford.com/content/dam/corporate/en/investors/investor-events/Sales%20Calls/2017/December-2016-Sales-Release-with-tables.pdf">https://corporate.ford.com/content/dam/corporate/en/investors/investor-events/Sales%20Calls/2017/December-2016-Sales-Release-with-tables.pdf</a>	January 4, 2017
“Frequently Asked Questions: Used Car,” <i>Kelley Blue Book</i> , <a href="https://www.kbb.com/company/faq/used-cars/">https://www.kbb.com/company/faq/used-cars/</a>	
“Guide to Car Pricing Terms,” <i>Consumer Reports</i> , <a href="https://www.consumerreports.org/car-pricing-negotiation/guide-to-car-pricing-terms/">https://www.consumerreports.org/car-pricing-negotiation/guide-to-car-pricing-terms/</a>	August 1, 2017
“J.D. Power Offers New Perspective with Residual Values,” <i>J.D. Power</i> <a href="https://www.jdpower.com/business/press-releases/jd-power-residual-values">https://www.jdpower.com/business/press-releases/jd-power-residual-values</a>	January 18, 2017
“Keys to Vehicle Leasing,” <i>Federal Reserve Board</i> , <a href="https://www.federalreserve.gov/pubs/leasing/resource/different/future.htm">https://www.federalreserve.gov/pubs/leasing/resource/different/future.htm</a>	
“Power Information Network [PIN],” <i>J.D. Power</i> , <a href="https://www.jdpower.com/business/solutions/power-information-network-pin">https://www.jdpower.com/business/solutions/power-information-network-pin</a>	
Adam Copeland, Wendy Dunn, and George Hall, “Inventories and the automobile market,” <i>RAND Journal of Economics</i> 42, no. 1	2001
Bryan K. Orme, “Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research,” Third Edition, Research Publishers LLC	2014
Fiona Scott Morton, Jorge Silva-Risso, and Florian Zettelmeyer, “What Matters in a Price Negotiation: Evidence From the U.S. Auto Retailing Industry,” <i>Quantitative Marketing and Economics</i> 9, no. 4	2011
Florian Zettelmeyer, Fiona Scott Morton, and Jorge Silva-Risso, “How the Internet Lowers Prices: Evidence from Matched Survey and Auto Transaction Data,” <i>Journal of Marketing Research</i> 43, no. 2	2006
Florian Zettelmeyer, Fiona Scott Morton, and Jorge Silva-Risso, “Scarcity Rents in Car Retailing: Evidence from Inventory Fluctuations at Dealerships,” NBER Working Paper no. 12177	2006



**Appendix B****Documents Considered by Justin McCrary**

<b>Document Title</b>	<b>Document Date</b>
Greg Allenby et al. "Using Conjoint Analysis to Determine the Market Value of Product Features." Proceedings of Sawtooth Software Conference.	October 2013
James M. Sallee, "The Surprising Incidence of Tax Credits for the Toyota Prius," <i>American Economic Journal: Economic Policy</i> 3, no. 2	2011
Jan Dijkstra, W. A. H. Roelen, and H. J. P. Timmermans, "Conjoint measurement in virtual environments: a framework," In Proceedings of 3rd Design and Decision Support Systems in Architecture and Urban Planning Conference Vol. 1	1996
Meghan Busse and Jorge Silva-Risso, "'One Discriminatory Rent' or 'Double Jeopardy': Multi-component Negotiation for New Car Purchases," <i>American Economic Review: Papers and Proceedings</i> 100, no. 2	2010
Meghan Busse, Jorge Silva-Risso, and Florian Zettelmeyer, "\$1000 Cash Back: The Pass-Through of Auto Manufacturer Promotions," <i>American Economic Review</i> 96, no. 4	2006
N. Gregory Mankiw, <i>Principles of Microeconomics</i> , Seventh Edition, Stamford, CT: Cengage Learning	2013
Ohjin Kwon et al., "The Informational Role of Product Trade-Ins for Pricing Durable Goods." <i>The Journal of Industrial Economics</i> 63, no. 4	2015
Ronald Montoya, "Trim Levels 101: All about Trims, Styles, Options and Packages", <i>Edmunds</i> , <a href="https://www.edmunds.com/car-buying/trim-levels-101.html">https://www.edmunds.com/car-buying/trim-levels-101.html</a>	May 26, 2017

**Data and Data Documentation**

Ford Market Offering Complexity Analysis of Panoramic Sunroofs for Edge, Escape and Explorer

JD Power PIN Data

JD Power PIN Data Glossary